

IN THE CLAIMS:

Please note that all claims currently pending and under consideration in the referenced application are shown below. Claims 1-4, 9-14, 18, 20, 22-34, 37-39, 41, 42, 45-47, 62-63, 68-75, and 78-87 are currently pending. Claims 2, 34, 38, 70, 75, 79, and 86 have been canceled. Claims 5-8, 15-17, 19, 21, 35, 36, 40, 43, 44, 58-61, 64-67, and 76-77 are withdrawn. This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A catheter connection system for effecting a fluid-tight coupling and a mechanical joinder between a medical device that accommodates fluid flow therethrough and ~~a-free~~ an end of a catheter having an outer wall with an exterior surface and an interior surface, the interior surface of the outer wall of the catheter defining a longitudinally extending fluid flow lumen ~~within the catheter therein~~, said connection system being capable of being manipulated by a user into an assembled condition, ~~and~~ said connection system comprising:

~~— a. —~~ a coupling hub including a ~~an elongated~~ catheter connection stem attached at the proximal end thereof to the medical device and having a distal end remote therefrom configured to be receivable in an end of the lumen of the catheter, said connection stem enclosing a fluid passageway extending between ~~said a~~ proximal end and ~~the tip of said a~~ distal end ~~thereof of the connection stem~~, said fluid passageway communicating with the medical device at said proximal end of said connection ~~stem-stem~~;

an enlargement formed on an exterior of the connection stem, the enlargement extending between a distal end and a proximal end thereof and terminating at the proximal end in a barrier wall encircling the connection stem;

~~— b. —~~ a catheter securement collar having an internal bore sized to receive said connection stem and to advance proximally ~~along said~~ relative to the exterior ~~thereof of the connection stem via coupling to the coupling hub from said distal end thereof~~ into said assembled condition of said connection system; and system;

~~in said assembled condition of said connection system the longitudinal axis of said securement collar coinciding with the longitudinal axis of said connection stem; and~~

a catheter locking ring formed on the internal bore of the securement collar at the distal end thereof, wherein a distal end of the locking ring in the assembled condition of the connection system is positioned proximal to the barrier wall of the connection stem.

~~c. grip enhancement means for constraining the outer wall of the catheter to traverse a tortuous path when said distal end of said connection stem is received in the lumen of the catheter and said securement collar and said connection stem are in said assembled condition of said connection system.~~

2. (Canceled).

3. (Currently Amended) A system as recited in Claim 2, 1, wherein said barrier wall of said enlargement is oriented generally perpendicularly to said ~~a~~ longitudinal axis of said connection stem.

4. (Currently Amended) A system as recited in Claim 3, wherein said barrier wall is a flat annular surface ~~disposed in a plane~~ oriented perpendicular to said longitudinal axis of said connection stem.

5. (Withdrawn-Currently Amended) A system as recited in Claim 2, 1, wherein said barrier wall of said enlargement forms an undercut into said enlargement at said proximal end thereof.

6. (Withdrawn-Currently Amended) A system as recited in Claim 5, wherein said barrier wall is a proximally facing frustoconical surface enlarging radially outwardly ~~in a proximal direction~~ away from a distal end of the enlargement along the ~~said~~ exterior of said connection stem to said proximal end of said enlargement.

7. (Withdrawn-Currently Amended) A system as recited in Claim 2, 1, wherein said barrier wall is a generally inclined surface enlarging radially outwardly in a distal direction from said exterior of said connection stem ~~to said proximal end of~~ toward the said enlargement.

8. (Withdrawn) A system as recited in Claim 7, wherein said barrier wall is frustoconical.

9. (Currently Amended) A system as recited in Claim 2, 1, wherein said locking ring comprises:

- ~~——~~ a. ~~——~~ a distal face encircling said internal bore of said securement collar; and
- ~~——~~ b. ~~——~~ an interior surface adjacent to and proximal of said distal face, the minimum radius of said interior surface being greater than the maximum radius of said enlargement ~~about said~~ with respect to a longitudinal axis of said connection stem.

10. (Currently Amended) A system as recited in Claim 9, wherein said distal face of said locking ring is generally perpendicular to ~~said~~ a longitudinal axis of said securement collar.

11. (Currently Amended) A system as recited in Claim 10, wherein said distal face of said locking ring is a flat annular surface ~~disposed in a plane~~ oriented perpendicular to said longitudinal axis of said securement collar.

12. (Previously Presented) A system as recited in Claim 9, wherein said interior surface of said locking ring is cylindrical.

13. (Currently Amended) A system as recited in Claim 2, 1, wherein said enlargement comprises a frustoconical barb, the outer surface of said barb enlarging radially outwardly in a ~~proximal~~ direction ~~about said~~ away from the distal end of said connection stem to a shoulder of said barb ~~at said~~ defined by the barrier wall.

14. (Previously Presented) A system as recited in Claim 13, wherein said barb is located at said tip of said distal end of said connection stem.

15. (Withdrawn) A system as recited in Claim 14, wherein said enlargement further comprises a secondary barb between said frustoconical barb and said tip of said distal end of said connection stem.

16. (Withdrawn-Currently Amended) A system as recited in Claim 2, 1, wherein said enlargement comprises:

——a.——a primary barb; and

——b.——a secondary barb located distally of said primary barb.

17. (Withdrawn-Currently Amended) A system as recited in Claim 16, wherein ~~the~~ a maximum radius of said secondary barb is greater than ~~the~~ a maximum radius of said primary barb.

18. (Currently Amended) A system as recited in Claim 2, 1, wherein said exterior of said connection stem proximal of said enlargement is cylindrical.

19. (Withdrawn-Currently Amended) A system as recited in Claim 2, 1, wherein said exterior of said connection stem proximal of said enlargement is a frustoconical surface enlarging radially outwardly in a proximal direction.

20. (Currently Amended) A system as recited in Claim 2, 1, ~~wherein~~, ~~wherein~~ in said assembled condition of said connection system, said internal bore of said securement collar proximal of said enlargement cooperates with said exterior of said connection stem to form a void encircling said connection stem interior of said connection system, said void having an enlarged closed proximal end and a smaller distal end opening ~~to the exterior of said connection system~~ between said securement collar and said exterior of said connection stem.

21. (Withdrawn) A system as recited in 20, wherein said exterior of said connection stem proximal of said enlargement is a frustoconical surface enlarging radially outwardly in a proximal direction.

22. (Currently Amended) A system as recited in Claim 20, wherein said exterior of said connection stem proximal of said enlargement is cylindrical, and said void has:

- a.——a constant inner diameter corresponding to said exterior of said connection stem proximal of said enlargement; and
- b.——a minimum outer diameter at said distal end of said void.

23. (Currently Amended) A system as recited in Claim 1, wherein said securement collar and said connection stem ~~are reusably disassemblable out of said~~ may be selectively assembled or disassembled ~~condition of said connection system.~~

24. (Previously Presented) A system as recited in Claim 1, wherein said securement collar is a circumferentially continuous tubular structure.

25. (Currently Amended) A system as recited in Claim 2, 1, further comprising attachment means for securing the proximal end of said securement collar in engagement with said exterior of said connection stem.

26. (Currently Amended) A system as recited in Claim 25, wherein said attachment means comprises:

- a.——a first set of threads on the exterior of said connection stem proximal of and remote from said enlargement; and
- b.——a second set of threads on a portion of said internal bore of said securement collar ~~encircling and opposing said first set of threads on said connection stem in said assembled condition of said connection system,~~ said second set of threads being configured to cooperate with said first set of threads in rotatingly advancing said securement collar proximally along said exterior of said connection stem into said assembled condition of said connection system.

27. (Currently Amended) A catheter connection system for effecting a fluid-tight coupling and a mechanical joinder between a medical device that accommodates fluid flow therethrough ~~and a free~~ an end of a catheter having an outer wall with an exterior surface and an interior surface, the interior surface of the outer wall of the catheter defining a longitudinally extending fluid flow lumen ~~within the catheter therein~~, said connection system being capable of being manipulated by a user into an assembled condition, and said connection system comprising:

~~—— a. — an elongated~~ a coupling hub including a catheter connection stem attached at the proximal end thereof to the medical device and having a distal end remote therefrom configured to be receivable in an end of the lumen of the catheter, said connection stem enclosing a fluid passageway extending between said proximal end and ~~the tip of said~~ a distal end thereof of the connection stem, said fluid passageway communicating with the medical device at said proximal end of said connection stem ~~stem~~; ~~and with the exterior of the connection stem at a location positioned inside the lumen of the catheter when the distal end of the connection stem is received therein, said connection stem comprising:~~

wherein the connection stem further comprises a frustoconical barb formed on ~~the~~ an exterior of said distal end of said connection stem, the outer surface of said barb enlarging radially outwardly ~~about said~~ from the distal end of said connection stem in a ~~proximal~~ direction ~~to toward~~ a shoulder of said barb, said barb terminating at said shoulder thereof in ~~a flat~~ an annular barrier wall encircling said connection stem ~~and disposed in a plane oriented perpendicular to the longitudinal axis of the connection stem, the barrier wall having a circular inner periphery and a concentric outer periphery coincident with the shoulder of the barb; and~~

~~—— ii. — a cylindrical portion of said connection stem adjacent to and proximal of said barrier wall, the outer surface of said cylindrical portion being concentrically disposed about said longitudinal axis of said connection stem with a radius equal to the radius of said inner periphery of said barrier wall; and~~

~~—— b. —~~ a catheter securement collar having an internal bore sized to receive said connection stem and to advance proximally ~~along said~~ relative to the exterior

~~thereof from said distal end thereof of the connection stem via coupling to the coupling hub into said assembled condition of said connection system-system; in the assembled condition of the connection system the longitudinal axis of the securement collar coinciding with the longitudinal axis of the connection stem, the securement collar comprising:~~

- ~~—— i. —— a proximal end capable of engaging said exterior of said connection stem in said assembled condition of said connection system; and~~
- ~~—— ii. —— a catheter locking ring formed on the interior internal bore of said securement collar remote from said proximal end thereof thereof; said locking ring comprising:~~

- ~~—— A. —— a flat distal face disposed in a plane perpendicular to said longitudinal axis of said securement collar; and~~

- ~~—— B. —— a cylindrical interior surface adjacent to and proximal of said distal face, the radius of said interior surface being greater than the radius of said outer periphery of said barrier wall of said barb about said longitudinal axis of said connection stem, the inner diameter of said internal bore of said securement collar being at a minimum at said locking ring, and said locking ring in said assembled condition of said connection system being positioned proximal of said shoulder of said barb concentrically encircling said cylindrical portion of said connection stem, thereby with said distal end of said connection stem received in the lumen of the catheter;~~

- ~~—— (1) —— wherein the coupling hub, the securement collar, and the frustoconical barb, in the assembled condition of the connection system, are structured for subjecting ~~the~~ a portion of the outer wall of the catheter disposed between said interior surface of said locking ring and said cylindrical portion of said connection stem to a condition of maximum compression produced in the outer wall of the catheter by said connection system-system; and~~

~~—— (2) —— producing distally from said interior surface of said locking ring a tortuous path for the outer wall of the catheter between said distal face of said locking ring and said barrier wall of said barb, about said shoulder of said barb, and distally along the portion of said outer surface of said barb adjacent said shoulder thereof.~~

28. (Previously Presented) A system as recited in Claim 27, wherein said locking ring is located at the distal end of said securement collar.

29. (Currently Amended) A system as recited in Claim 27, further including a rounded fillet extending between the distal end of said barb and said tip of said distal end of said connection stem.

30. (Currently Amended) A system as recited in Claim 27, ~~wherein~~ wherein, in said assembled condition of said connection system, said internal bore of said securement collar proximal of said locking ring cooperates with said outer surface of said cylindrical portion of said connection stem to form a void encircling said connection stem ~~interior of said connection system~~, said void having an enlarged closed proximal end and a smaller distal end opening to said exterior of said connection system between said locking ring and said cylindrical portion of said connection stem.

31. (Previously Presented) A system as recited in Claim 27, further comprising attachment means for securing said proximal end of said securement collar in engagement with said exterior of said connection stem.

32. (Currently Amended) A system as recited in Claim 31, wherein said attachment means for securing comprises:

~~—— a. ——~~ a first set of threads on said exterior of said connection stem proximal of said cylindrical portion thereof; and

~~_____b._____~~ a second set of threads on a portion of said internal bore of said securement collar ~~encircling and opposing the first set of threads on the connection stem in the assembled condition of the connection system,~~ said second set of threads being configured to cooperate with said first set of threads in rotatingly advancing said securement collar proximally along said exterior of said connection stem into said assembled condition of said connection system.

33. (Currently Amended) A system as recited in Claim 27, wherein said securement collar and said connection stem ~~are reusably disassemblable out of said~~ may be selectively assembled or disassembled ~~condition thereof.~~

34. (Canceled).

35. (Previously Presented) A system as recited in Claim 27, wherein the medical device is a subcutaneously implantable vascular access port.

36. (Previously Presented) A system as recited in Claim 27, wherein the medical device is a replacement hub of a catheter repair kit.

37. (Currently Amended) A catheter connection system for effecting a fluid-tight coupling and a mechanical joinder between a medical device that accommodates fluid flow therethrough and a free end of a catheter having an outer wall with an exterior surface and an interior surface, the interior surface of the outer wall of the catheter defining a longitudinally extending fluid flow lumen within the catheter, said connection system being capable of being manipulated by a user into an assembled condition, and said connection system comprising:

~~_____a._____~~ ~~an elongated~~ a coupling hub including a catheter connection stem attached at the proximal end thereof to the medical device and having a distal end remote therefrom configured to be receivable in an end of the lumen of the catheter, said connection stem enclosing a fluid passageway extending between said proximal end and ~~the tip of said~~ a distal end thereof of the connection stem, said fluid passageway communicating with the medical device at said proximal end of said

~~connection stem and with the exterior of the connection stem at a location positioned inside the lumen of the catheter when the distal end of the connection stem is received therein, the connection stem comprising a first set of threads on the exterior of the proximal end of the connection stem;~~

~~b. a catheter securement collar having an internal bore sized to receive said connection stem and to advance proximally along said relative to the exterior thereof of the connection stem via coupling to the coupling hub from said distal end thereof into said assembled condition of said connection system; system, in the assembled condition of the connection system the longitudinal axis of the securement collar coinciding with the longitudinal axis of the connection stem;~~
wherein the internal bore of the securement collar includes a purchase enhancement region, the purchase enhancement region located intermediate the proximal and distal ends thereof; and

wherein the internal diameter of the purchase enhancement region of the internal bore of the securement collar increases in a proximal direction longitudinally along the securement collar more rapidly than any increase in the outer diameter of the exterior of the connection stem radially adjacent the purchase enhancement region.

~~i. a proximal end;~~

~~ii. a second set of threads on said internal bore of said securement collar at said proximal end thereof, said second set of threads being configured to cooperate with said first set of threads in rotatingly advancing said securement collar proximally along said exterior of said connection stem into said assembled condition of said connection system; and~~

~~iii. a distal end located at a longitudinal distance along said securement collar from said second set of threads, said longitudinal distance being less than the longitudinal distance of said tip of said distal end of said connection stem from said first set of threads; and~~

~~c. purchase enhancement means for retaining a securement lip of catheter material from the outer wall of the catheter internal of said connection system in~~

~~said assembled condition thereof with said distal end of said connection stem received in the lumen of the catheter.~~

38. (Canceled).

39. (Currently Amended) A system as recited in Claim ~~38~~, 37, wherein:

- ~~a.~~ ~~said~~ the exterior of said connection stem opposite from said purchase enhancement region of said internal bore of said securement collar in said assembled condition of said catheter connection system is cylindrical; and
- ~~b.~~ ~~said a void is formed between an exterior surface of the connection stem and the internal bore of the securement collar, the void has including a~~ constant inner diameter, a closed proximal end, and a minimum outer diameter at said distal end of said securement collar.

40. (Withdrawn-Currently Amended) A system as recited in Claim ~~38~~, 37, wherein said exterior of said connection stem opposite said purchase enhancement region of said internal bore of said securement collar in said assembled condition of said connection system enlarges radially outwardly in a proximal direction.

41. (Previously Presented) A system as recited in Claim 37, further comprising an enlargement formed on the exterior of said distal end of said connection stem, said enlargement terminating at a proximal end thereof in a barrier wall encircling said connection stem.

42. (Currently Amended) A system as recited in Claim 41, wherein said enlargement comprises a frustoconical barb, the outer surface of said frustoconical barb enlarging radially outwardly in a ~~proximal~~ direction ~~about said~~ away from the distal end of said connection stem to a shoulder of said barb ~~at said~~ defined by the barrier wall.

43. (Withdrawn) A system as recited in Claim 42, wherein said enlargement further comprises a secondary barb between said frustoconical barb and said tip of said distal end of said connection stem.

44. (Withdrawn-Currently Amended) A system as recited in Claim 41, wherein said enlargement comprises:

- a.——a primary barb; and
- b.——a secondary barb located distally of said primary barb.

45. (Currently Amended) A system as recited in Claim 41, further comprising a catheter locking ring formed on the interior of said securement collar at said distal end thereof, ~~said~~ wherein a distal end of the locking ring in said assembled condition of said connection system ~~being~~ is positioned proximal ~~of said~~ to the enlargement on said connection stem ~~encircling said~~ and encircles the exterior of said connection stem.

46. (Currently Amended) A system as recited in Claim 45, wherein said locking ring comprises:

- a.——a distal face encircling said internal bore of said securement collar; and
- b.——an interior surface adjacent to and proximal of said distal face, the minimum radius of said interior surface being greater than the maximum radius of said enlargement ~~about said~~ with respect to the longitudinal axis of said connection stem.

47. (Currently Amended) A catheter connection system for effecting a fluid-tight coupling and a mechanical joinder between a medical device that accommodates fluid flow therethrough and ~~a free~~ an end of a catheter having an outer wall with an exterior surface and an interior surface, the interior surface of the outer wall of the catheter defining a longitudinally extending fluid flow lumen ~~within the catheter therein~~, said connection system being capable of being manipulated by a user into an assembled condition, and the connection system comprising:

- a.——~~an elongated~~ a coupling hub including a catheter connection stem attached at the proximal end thereof to the medical device and having a distal end remote therefrom configured to be receivable in an end of the lumen of the catheter, said connection stem enclosing a fluid passageway extending between ~~said a proximal end and the tip of said~~ a distal end thereof of the connection stem, said fluid passageway communicating with the medical device at said proximal end of said

connection stem and with the exterior of the connection stem at a location positioned inside the lumen of the catheter when the distal end of the connection stem is received therein, the connection stem ~~comprising~~ comprising:

a first set of threads on the exterior of the proximal end of the connection stem;
an enlargement formed on an exterior of the connection stem, the enlargement extending between a distal end and a proximal end thereof and terminating at the proximal end in a barrier wall encircling the connection stem;

— b. — a catheter securement collar having an internal bore sized to receive said connection stem and to advance proximally ~~along said~~ relative to the exterior thereof of the connection stem via coupling to the coupling hub from the distal end thereof into said assembled condition of said connection system, ~~in the assembled condition of the connection system the longitudinal axis of the securement collar coinciding with the longitudinal axis of the connection stem,~~ the said securement collar further comprising:

— i. — a proximal end;

— ii. — a second set of threads on said internal bore of said securement collar ~~at said proximal end thereof~~, said second set of threads being configured to cooperate with said first set of threads ~~in~~ for rotatingly advancing said securement collar proximally along said exterior of said connection stem into said assembled condition of said connection system; and

— iii. — a distal end located at a longitudinal distance said securement collar from said second set of threads, said longitudinal distance being less than the longitudinal distance of said tip of said distal end of said connection stem from said first set of threads, in said assembled condition of said connection system said internal bore of said securement collar proximal of said distal end of said securement collar cooperating with said exterior of said connection stem to form a void encircling said connection stem interior of said connection system, said void having an enlarged closed proximal end and a smaller distal end opening to said exterior of

said connection system between said distal end of said securement collar and said exterior of said connection ~~stem-stem~~;
wherein a distal end of the securement collar, in the assembled condition of the connection system, is positioned adjacent to the barrier wall of the connection stem.

48. (Currently Amended) A system as recited in Claim 47, further comprising a barb formed on the exterior of said distal end of said connection stem enlarging radially outwardly in a ~~proximal~~ direction ~~about said~~ away from the distal end of said connection stem to a shoulder of said barb.

49. (Currently Amended) A system as recited in Claim 48, further comprising a catheter locking ring on the interior of said securement collar at said distal end thereof, said locking ring comprising:

- ~~_____~~ a. ~~_____~~ a flat distal face ~~disposed in a plane~~oriented perpendicular to said longitudinal axis of said securement collar; and
- ~~_____~~ b. ~~_____~~ a cylindrical interior surface adjacent to and proximal of said distal face, ~~the~~ wherein a minimum radius of said interior surface ~~being of the locking ring is~~ greater than ~~the~~ a maximum radius of said barb ~~about said longitudinal axis of~~ said connection stem.

50. (Currently Amended) A system as recited in Claim 49, wherein said ~~barb terminates at said shoulder thereof in a~~ barrier wall encircling said connection stem ~~and disposed in~~ comprises a plane surface oriented perpendicular to said ~~a~~ longitudinal axis of said connection stem, said barrier wall having a circular inner periphery and a concentric outer periphery coincident with the radially outward limit of said shoulder of said barb.

51. (Currently Amended) A system as recited in Claim 50, wherein said connection stem further comprises a cylindrical portion adjacent to and proximal of said barb, the outer surface of said cylindrical portion of the locking ring being

concentrically disposed about said longitudinal axis of said connection stem with a radius equal to the radius of said inner periphery of said barrier wall.

52. (Currently Amended) A catheter connection system for effecting a fluid-tight coupling and a mechanical joinder between a medical device that accommodates fluid flow therethrough and ~~a free~~ an end of a catheter having an outer wall with an exterior surface and an interior surface, the interior surface of the outer wall of the catheter defining a longitudinally extending fluid flow lumen ~~within the catheter therein~~, said connection system being capable of being manipulated by a ~~wall-user~~ into an assembled condition, and said connection system comprising:

- ~~_____ a.~~ a coupling hub including an elongated catheter connection stem attached at the proximal end thereof to the medical device and having a distal end remote therefrom configured to be receivable in the lumen of the catheter, said connection stem enclosing a fluid passageway extending between said proximal end and the tip of said distal end thereof, said fluid passageway communicating with the medical device at said proximal end of said connection stem ~~and with the exterior of the connection stem at a location positioned inside the lumen of the catheter when the distal end of the connection stem is received therein~~, said connection stem ~~comprising; comprising:~~
 - ~~_____ i.~~ a cylindrical portion of said connection stem proximal of said tip of said distal end of said connection stem, the outer surface of said cylindrical portion being concentrically disposed about the a longitudinal axis of said connection stem;
 - ~~_____ ii.~~ a first set of threads on said exterior of said connection stem adjacent to and proximal of said cylindrical portion thereof;
 - ~~_____ iii.~~ an enlargement formed on the exterior of said distal end of said connection stem proximal of and adjacent to said cylindrical portion, said enlargement terminating at a proximal end thereof in a barrier wall encircling said connection stem-stem;
- ~~_____ b.~~ a tubular catheter securement collar having an internal bore sized to receive said connection stem and to advance proximally along said relative to the

~~exterior thereof of the connection stem via coupling to the coupling hub from the distal end thereof into said assembled condition of said connection system, in the assembled condition of the connection system the longitudinal axis of the securement collar coinciding with the longitudinal axis of the connection stem,~~
said securement collar comprising:

- i. —— a second set of threads on a portion of said internal bore of said securement collar encircling and opposing said first set of threads on said connection stem in said assembled condition of said connection system, said second set of threads being configured to cooperate with said first set of threads in rotatingly advancing said securement collar proximally along said exterior of said connection stem into said assembled condition of said connection system; and
- ii. —— a distal end located at a longitudinal distance along said securement collar from said second set of threads, said longitudinal distance being less than the longitudinal extent of said cylindrical portion of said connection stem.

53. (Previously Presented) A system as recited in Claim 52, wherein in said assembled condition of said connection ~~system~~ system, said internal bore of said securement collar cooperates with said outer surface of said cylindrical portion of said connection stem to form a void encircling said connection stem interior of said connection system, said void having a constant inner diameter, a closed proximal end, and a minimum outer diameter at said distal end of said securement collar.

54. (Currently Amended) A system as recited in Claim 52, further comprising a catheter locking ring formed on ~~the~~ an interior of said securement collar at said distal end thereof, the inner diameter of said internal bore of said securement collar being at a minimum at said locking ring.

55. (Currently Amended) A system as recited in Claim 54, wherein said locking ring comprises:

- a.——a flat distal face ~~disposed in a plane~~oriented perpendicular to said longitudinal axis of said securement collar; and
- b.——a cylindrical interior surface adjacent to and proximal of said flat distal face, ~~the~~ wherein a minimum radius of said interior surface ~~being of the locking ring is~~ greater than the a maximum radius of said enlargement ~~about said longitudinal axis of said connection stem.~~

56. (Previously Presented) A system as recited in Claim 52, wherein said enlargement comprises a barb formed on said exterior of said distal end of said connection stem, the outer surface of said barb enlarging radially outwardly about said distal end of said connection stem proximally to a shoulder of said barb at said barrier wall.

57. (Currently Amended) A system as recited in Claim 56, wherein said barrier wall ~~is disposed in~~ c omprises a plane s urface oriented perpendicular to said longitudinal axis of said connection stem, and ~~said barrier wall~~ has a circular inner periphery and a concentric outer ~~periphery, said periphery; and wherein the~~ outer periphery of said barrier wall ~~being~~ is coincident with the radially outward limit of said shoulder of said barb.

58. (Withdrawn) A system as recited in Claim 52, wherein said barrier wall is frustoconical.

59. (Withdrawn) A system as recited in claim 56, wherein said enlargement further comprises a secondary barb between said barb and said tip of said distal end of said connection stem.

60. (Withdrawn-Currently Amended) A system as recited in claim 52, wherein said enlargement comprises:

- a.——a primary barb; and

———b.———a secondary barb located distally of said primary barb.

61. (Withdrawn) A system as recited in claim 60, wherein the maximum radius of said secondary barb is greater than the maximum radius of said primary barb.

62. (Previously Presented) A system as recited in claim 52, wherein said barrier wall of said enlargement is oriented generally perpendicularly to said longitudinal axis of said connection stem.

63. (Currently Amended) A system as recited in claim 62, wherein said barrier wall is comprises a flat annular surface ~~disposed in a plane~~ oriented perpendicular to said longitudinal axis of said connection stem.

64. (Withdrawn) A system as recited in claim 52, wherein said barrier wall of said enlargement forms an undercut into said enlargement at said proximal end thereof.

65. (Withdrawn-Currently Amended) A system as recited in claim 64, wherein said barrier wall is a proximally facing frustoconical surface enlarging radially outwardly in a proximal direction from said exterior of said connection stem ~~to~~ toward said proximal end of said enlargement.

66. (Withdrawn) A system as recited in claim 52, wherein said barrier wall is a generally inclined surface enlarging radially outwardly in a distal direction from said exterior of said connection stem to said proximal end of said enlargement.

67. (Withdrawn) A system as recited in claim 66, wherein said barrier wall is frustoconical.

68. (Currently Amended) A catheter connection system for effecting a fluid-tight coupling and a mechanical joinder between a medical device that accommodates fluid flow therethrough and ~~a free~~ an end of a cardiovascular access catheter having an outer wall with an exterior surface and an interior surface, the interior surface of the

outer wall of the catheter defining a longitudinally extending fluid flow lumen ~~within the catheter therein~~, said connection system being capable of being manipulated by a user into an assembled condition, and said connection system comprising:

- ~~_____ a. _____ an elongated~~ a coupling hub including a catheter connection stem attached at the proximal end thereof to the medical device and having a distal end remote therefrom configured to be receivable in an end of the lumen of the catheter, said connection stem enclosing a fluid passageway extending between said proximal end and ~~the tip of said~~ a distal end thereof of the connection stem, said fluid passageway communicating with the medical device at said proximal end of said connection stem; ~~stem and with the exterior of the connection stem at a location positioned inside the lumen of the catheter when the distal end of the connection stem is received therein, the connection stem comprising:~~
- ~~_____ i. _____ wherein the connection stem further comprises~~ a barb formed on the exterior of said distal end of said connection stem, the outer surface of said barb enlarging radially outwardly ~~about said~~ from the distal end of said connection stem proximally from said tip of said distal end of said connection stem to a shoulder of said barb, said barb terminating at said shoulder thereof in a barrier wall oriented generally perpendicularly to ~~the~~ a longitudinal axis of said connection stem, said barrier wall having a circular inner periphery and an outer periphery coincident with the radially outward limit of said shoulder of said barb; and
 - ~~_____ ii. _____ a cylindrical portion of the connection stem adjacent to and proximal of the barrier wall, the outer surface of the cylindrical portion being concentrically disposed about the longitudinal axis of the connection stem and having a radius equal to the radius of the inner periphery of the barrier wall; and~~
- ~~_____ b. _____~~ a catheter securement collar having an internal bore sized to receive said connection stem and to advance proximally along said exterior thereof from said distal end thereof into said assembled condition of said connection system; ~~system, in the assembled condition of the connection system the longitudinal axis~~

~~of the securement collar coinciding with the longitudinal axis of the connection stem, the securement collar comprising:~~

- ~~i. — wherein the securement collar further comprises~~ a proximal end capable of engaging said exterior of said connection stem in said assembled condition of said connection system; and
- ~~ii. — pinching means wherein the coupling hub, the barb, and the securement collar, in the assembled condition of the connection system, are structured for urging a portion of the outer wall of the catheter against said outer surface of said cylindrical portion of said connection stem to ~~create thereat~~ create, thereat, in said a portion of the outer wall of the catheter, a longitudinally uniform condition of maximum compression ~~produced in the outer wall of the catheter by the connection system.~~~~

69. (Currently Amended) A system as recited in Claim 68, wherein ~~said pinching means~~ the securement collar comprises a catheter locking ring on the interior of said securement collar remote from said proximal end thereof, said locking ring comprising:

- ~~a. —~~ a distal face encircling said internal bore of said securement collar; and
- ~~b. —~~ a cylindrical interior surface adjacent to and proximal of said distal face, the radius of said interior surface of said locking ring being greater than the radius of said outer periphery of said barrier wall of said barb ~~about said~~ with respect to a longitudinal axis of said connection stem, wherein the inner diameter of said internal bore of said securement collar ~~being~~ is at a minimum at said locking ring, and said locking ~~ring~~ ring, in said assembled condition of said connection system, is ~~being~~ positioned proximal of said shoulder of said barb concentrically encircling said cylindrical portion of said connection stem.

70. (Canceled).

71. (Currently Amended) A system as recited in Claim 69, wherein said distal face of said locking ring is generally perpendicular to ~~said~~ a longitudinal axis of said securement collar.

72. (Currently Amended) A system as recited in Claim 71, wherein said distal face of said locking ring is a ~~flat-flat~~, annular surface ~~disposed in a plane~~oriented perpendicular to said longitudinal axis of said securement collar.

73. (Previously Presented) A system as recited in Claim 68, wherein said barb is frustoconical.

74. (Currently Amended) A system as recited in Claim 68, further comprising:

- ~~— a. —~~ a first set of threads on said exterior of said connection stem proximal of said cylindrical portion thereof; and
- ~~— b. —~~ a second set of threads on a portion of said internal bore of said securement collar ~~encircling and opposing the first set of threads on the connection stem in the assembled condition of the connection system~~, said second set of threads being configured to cooperate with said first set of threads ~~in~~ for rotatingly advancing said securement collar proximally along said exterior of said connection stem into said assembled condition of said connection system.

75. (Canceled).

76. (Withdrawn-Currently Amended) A system as recited in Claim 68, wherein the connection system is configured for attaching medical device ~~is a~~ subcutaneously implantable vascular access port to a catheter.

77. (Withdrawn-Currently Amended) A system as recited in Claim 68, wherein the connection system is configured for attaching medical device ~~is a~~ replacement hub of a catheter repair kit.

78. (Currently Amended) A catheter connection system for effecting a fluid-tight coupling and a mechanical joinder between a medical device that accommodates fluid flow therethrough and ~~a free~~ an end of a catheter having an outer wall with an exterior surface and an interior surface, the interior surface of the outer wall of the

catheter defining a longitudinally extending fluid flow lumen ~~within the catheter therein~~, said connection system being capable of being manipulated by a user into an assembled condition, and said connection system comprising:

- ~~_____ a. _____ an elongated~~ a coupling hub including a catheter connection stem attached at the proximal end thereof to the medical device and having a distal end remote therefrom configured to be receivable in an end of the lumen of the catheter, said connection stem enclosing a fluid passageway extending between said proximal end and ~~the tip of said~~ a distal end thereof of the connection stem, said fluid passageway communicating with the medical device at said proximal end of said connection stem; ~~stem and with the exterior of the connection stem at a location positioned inside the lumen of the catheter when the distal end of the connection stem is received therein, the connection stem comprising:~~
 - ~~_____ i. _____ wherein the connection stem further comprises~~ a barb formed on the exterior of said distal end of said connection stem, the outer surface of said barb enlarging radially outwardly ~~about said~~ from the distal end of said connection stem proximally to a shoulder of said barb; and
 - ~~_____ ii. _____ a first set of threads on the exterior of the connection stem proximal of and remote from the barb; and~~
- ~~_____ b. _____~~ a catheter securement collar having an internal bore sized to receive said connection stem and to advance proximally ~~along said~~ relative to the exterior thereof ~~from said distal end thereof of the connection stem via coupling to the coupling hub~~ into said assembled condition of said connection system, wherein the securement collar further comprises, in the assembled condition of the connection system the longitudinal axis of the securement collar coinciding with the longitudinal axis of the connection stem, the securement collar comprising:
 - ~~_____ i. _____~~ a proximal end;
 - ~~_____ ii. _____~~ a catheter locking ring on the interior of said securement collar remote from said proximal end thereof, said locking ring having a cylindrical interior surface, the wherein a minimum radius of said interior surface ~~being is~~ is greater than ~~the~~ a maximum radius of said barb ~~about said longitudinal axis of said connection stem; and~~

~~iii.~~ a second set of threads on said internal bore of said securement collar ~~at the proximal end thereof~~, said second set of threads being configured to cooperate with said first set of threads in rotatingly advancing ~~said locking ring of~~ the securement collar proximally along said exterior of said connection stem, ~~over the barb on the connection stem, and~~ into said assembled condition of said connection ~~system~~ system; wherein a distal end of the securement collar, in the assembled condition of the connection system, is positioned adjacent to the barrier wall of the connection stem.

79. (Canceled).

80. (Currently Amended) A system as recited in Claim ~~79, 78~~, wherein said distal face of said locking ring is ~~disposed in a plane~~ perpendicular to said longitudinal axis of said securement collar.

81. (Previously Presented) A system as recited in Claim 78, wherein in said assembled condition of said connection system said internal bore of said securement collar proximal of said locking ring cooperates with said exterior of said connection stem to form a void encircling said connection stem interior of said connection system, said void having an enlarged closed proximal end and smaller distal end opening to said exterior of said connection system between said locking ring and said exterior of said connection stem.

82. (Currently Amended) A system as recited in Claim 81, wherein said exterior of said connection stem proximal of said barb is cylindrical, and said void has:

- ~~a.~~ a constant inner diameter corresponding to said exterior of said connection stem proximal of said barb; and
- ~~b.~~ a minimum outer diameter at said distal end of said void.

83. (Currently Amended) A catheter connection system for effecting a fluid-tight coupling and a mechanical joinder between a medical device that accommodates

fluid flow therethrough and ~~a free~~ an end of a catheter having an outer wall with an exterior surface and an interior surface, the interior surface of the outer wall of the catheter defining a longitudinally extending fluid flow lumen ~~within the catheter therein~~, the connection system being capable of being manipulated by a user into an assembled condition, and the connection system comprising:

~~—— a. —— an elongated~~ a coupling hub including a catheter connection stem attached at the proximal end thereof to the medical device and having a distal end remote therefrom configured to be receivable in an end of the lumen of the catheter, said connection stem enclosing a fluid passageway extending between ~~said a proximal end and the a tip of the distal end thereof of the connection stem~~, said fluid passageway communicating with the medical device at said proximal end of said connection ~~stem; stem and with the exterior of the connection stem at a location positioned inside the lumen of the catheter when the distal end of the connection stem is received therein, the connection stem comprising:~~

an enlargement formed on an exterior of the connection stem, the enlargement extending between a distal end and a proximal end thereof and terminating at the proximal end in a barrier wall encircling the connection stem; and

~~—— i. —— an enlargement formed on the exterior of the distal end of the connection stem, the enlargement terminating in a proximal direction in a barrier wall encircling the connection stem and oriented generally perpendicularly to the longitudinal axis of the connection stem; and~~

~~—— ii. —— a cylindrical portion of the connection stem adjacent to and proximal of the barrier wall, the outer surface of the cylindrical portion being concentrically disposed about the longitudinal axis of the connection stem; and~~

~~—— b. —— a catheter securement collar having an internal bore sized to receive said connection stem and to advance proximally along said~~ relative to the exterior thereof from said distal end thereof of the connection stem via coupling to the coupling hub into said assembled condition of said connection system, ~~in the assembled condition of the connection system the longitudinal axis of the securement collar coinciding with the longitudinal axis of the connection stem, the securement collar comprising:~~

- ~~——i.——~~ a proximal end; and
- ~~——ii.——~~ a catheter locking ring on the interior of said securement collar distal of and remote from said proximal end thereof, said locking ring comprising a cylindrical interior surface concentrically disposed about said longitudinal axis of said securement collar, ~~the~~ wherein a minimum radius of said interior surface being is greater than the a maximum radius of said enlargement; ~~enlargement about the longitudinal axis of the connection stem~~

wherein a distal end of the securement collar, in the assembled condition of the connection system, is positioned adjacent to the barrier wall of the connection stem.

84. (Previously Presented) A system as recited in Claim 83, further comprising translation means for advancing said locking ring proximally over said enlargement on said connection stem.

85. (Currently Amended) A system as recited in Claim 84, wherein said translation means comprises:

- ~~——a.——~~ a first set of threads on said exterior of said connection stem proximal of said cylindrical portion thereof; and
- ~~——b.——~~ a second set of threads on a portion of said internal bore of said securement collar ~~encircling and opposing said first set of threads on said connection stem in said assembled condition of said connection system,~~ said second set of threads being configured to cooperate with said first set of threads in rotatingly advancing said securement collar proximally along said exterior of said connection stem into said assembled condition of said connection system.

86. (Canceled).

87. (Currently Amended) A system as recited in Claim 83, wherein said enlargement comprises a frustoconical barb, the outer surface of said barb enlarging radially outwardly about said distal end of said connection stem proximally to a shoulder of said barb ~~at said barrier wall~~.